

# Teachers conversations during design of technology rich curriculum activities for early literacy

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## Teachers conversations during design of technology rich curriculum activities for early literacy

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### *Abstract*

Design activities can be considered a fruitful opportunity for teacher collaborative reasoning and development of TPACK (Technological Pedagogical Content Knowledge). Teachers in this study, design technology rich curriculum activities for early literacy. The aim of this study is to explore how their explicated reasoning during the conversations they hold show change over time in relation to what they reason about and whether their technological pedagogical and content knowledge (TPACK) changes or even plays a role in this process. The findings suggest the design conversations provide a promising context for teacher learning because they higher levels of inquiry (application and use) dominate the conversations; and the kinds of considerations that dominate the conversations, in this small study, seem to shift over time. This would furthermore suggest that indeed by being engaged in design of technology, TPACK develops.

### *Theoretical underpinnings*

Technology is steadily gaining more foothold in kindergarten practice and classrooms. As such, kindergarten teachers are challenged with how to integrate computers in such a way that they aid kindergartners in developing skills in various areas of development. Especially, technology may be used in a rich learning environment targeting the attainment of early literacy skills by kindergartners (Lankshear and Knobel, 2005; Van Scoter, 2008)

TPACK has been conceptualized as the knowledge and skills related to technology integration in the classroom, which teachers develop when they collaborate on the design of learning material and instruction with technology (TPACK, Mishra and Koehler, 2005, 2008; Niess, 2011). Several studies found that teachers increased and gained TPACK by designing and implementing learning material (Mishra, Koehler and Yahya, 2007).

TPACK represents a useful way of conceptualizing explicated reasoning during design of such before mentioned material, because it highlights how during such a task a teacher integrates knowledge and beliefs from pedagogy (p), early literacy (c) and technology (t) to shape knowledge and beliefs in any of the four compound domains (tp, tc, pc and tpck).

Especially higher order inquiry processes such as analysis and planning are considered to aid a team in developing new knowledge and understanding, and thus might foster the development of TPACK in design teams.

### *Goals*

However, there is little understanding of how TPACK develops when teachers solve design problems. Especially there is a lack of understanding how TPACK develops in small groups in kindergarten education. Design problems are complex, and in order to provide them with adequate support, we need to understand the explicated reasoning that occurs during their design conversations. To accomplish this goal, the conversations of teachers are investigated on the depth of inquiry and the design reasoning. With depth of inquiry we mean the level of cognitive engagement that emerges in their conversations and explicated reasoning (Henry, 2013; Marzano and Kendall, 2007). From low level recognition and sharing to higher level analyzing and knowledge use / decision-making; design reasoning is investigated by looking at what kind of thinking influences this reasoning: practical concerns, existing orientations such as TPACK or external priorities.

### *Methods*

One team of kindergarten teachers (n=6, all female) was engaged in three design-workshops in which technology rich curriculum activities for early literacy were designed. These workshops were videotaped and transcribed verbatim. After careful reading of the transcripts and investigating the video's, the entire transcript was segmented in episodes (larger pieces of discourse on a similar topic or carrying similarity in tone of voice).

First these episodes were coded descriptively on depth of inquiry as either pertaining to: retrieval - teacher reacts directly, does not elaborate; comprehension - teacher shares his or her understanding of the problem; analysis - teacher expresses reasoning about the problem; knowledge utilization - teachers translate their understanding to action or planning.

Second, these episodes were coded descriptively as either pertaining to practical concerns (planning, organization and time); existing orientations (TPACK knowledge and beliefs); external priorities (priorities by stakeholders that have to be met in classroom practice).

Finally, in the episodes in which teachers explicate their existing orientations, single utterances were coded again on (a) depth of inquiry (not all utterances in episodes coded as analysis have to be coded as such) and (b) pertaining to either one of the seven TPACK domains (T, P, C, TP, TC, PC, TPCK).

### *Findings*

This study found that within each of the three episodes, a pattern occurs: team reasons about what is planned in their classroom -> when one teacher identifies an aspect she did not agree with, she proposes and makes a counterargument -> other teachers respond and engage in analyzing the problem in more detail -> when agreement is reached implicitly, teachers replan and make decisions on how the problem is solved. -> teachers brainstorm to make the plan concrete.

Second, reasoning on practical concerns (teachers plan and reason on for instance how children are seated behind a computer) shifts more towards reasoning from their existing orientations when comparing the three workshops (how they believe children learn early literacy with or without technology).

Third, when reasoning, teachers explicate how they believe children in kindergarten education learn and develop early literacy skills.

### *Conclusions and discussion*

The main conclusions that can be drawn from this study is that (1) the design conversations do seem to provide a promising context for teacher learning because they higher levels of inquiry (application and use) dominate the conversations; and (2) the kinds of considerations that dominate the conversations, in this small study, seem to shift over time (from mainly organizational issues towards issues and topics related to their existing orientations).

Since in all levels of education teachers keep struggling with how to use technology in such a way that it becomes productive and students benefit from it, this study gives insight in the conversations of these teachers and the concerns they have. This study's results should be considered in light of support provided to teachers. Taking into considerations the practical concerns teachers initially have, when these concerns are taken seriously, over time teachers might be more inclined to reason from their existing orientations on TPACK. In other words, any one who aims at improving educational practice with the use of technology, should aim to help teachers in resolving these concerns. If teachers feel relieved of these concerns, they can engage in higher levels of inquiry, knowledge sharing and building.